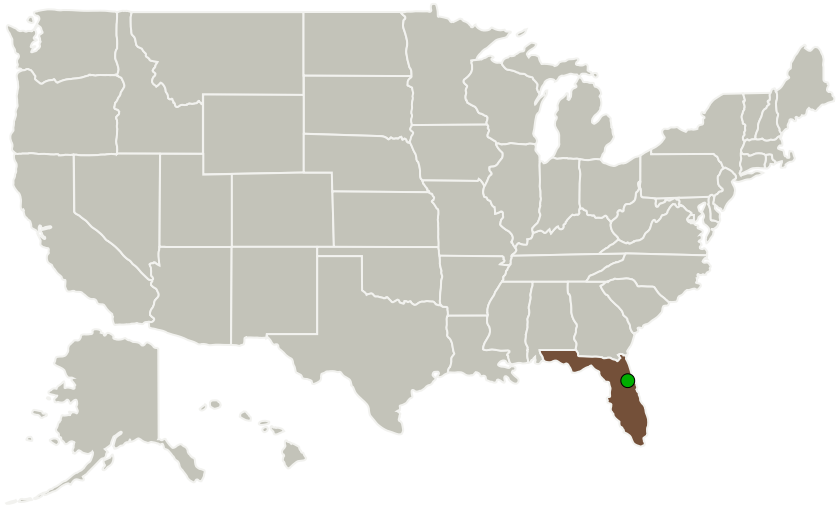
Manufacture of Novel Cryogenic Thermal Protection Materials, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

Advanced Materials Technology, Inc (AMTI) responds to the NASA SBIR solicitation X8 "Space Cryogenic Systems" under subtopic X8.01, "Cryogenic Fluid Transfer and Handling". The proposed Phase II SBIR program is aimed at developing new cryogenic insulations for passive thermal control, resulting in zero boil-off storage of cryogens. The passive thermal control will serve to limit the heat leak into the cryogenic storage system. The proposed technology is expected to increase reliability, increase cryogenic system performance, and is capable of being made flight qualified for the flight systems and to meet Exploration Systems mission requirements. We will continue to use the technical approaches that have shown tremendous potential during the successful Phase I effort. Our key approach will be based on the development, fabrication, and characterization of organic-inorganic hybrid nanocomposite microfoams. In the Phase I program, we successfully demonstrated the feasibility of fabrication of these new foams with significantly improved morphology and thermo-mechanical properties. The proposed approach will utilize environmentally friendly blowing agents. The closed cell structure of these novel foams will prevent the occurrence of cryopumping. The proposed effort will further enhance and optimize the novel microfoams, scale up the optimized materials, and culminate in the fabrication of prototype materials to demonstrate the readiness and maturity of our techniques.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Advanced Materials Technology, Inc.	Lead Organization	Industry	Tampa, Florida
Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations
Florida

Project Transitions

July 2011: Project Start

June 2013: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Materials Technology, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Akbar Ghaneh Fard

Co-Investigator:

Akbar Ghaneh-fard

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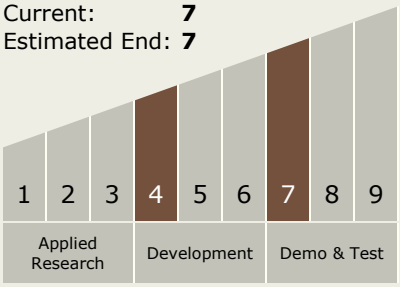
Technology Maturity (TRL)

Start: **4**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.2 Electric Space Propulsion
    - TX01.2.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System